

TOURNIQUET *Safety and Efficacy*

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Studies Identify the Recommended Field Tourniquet

ISSUE:

The U.S. Military identified the need for a safe and effective field tourniquet that could be applied with one hand by any soldier injured in combat. Several studies have been conducted to review available field tourniquets.

BACKGROUND:

In 2004, the U.S. Army Institute of Surgical Research (USAISR) conducted a study of 10 tourniquets available on the market. The Combat Application Tourniquet® (C-A-T®) was identified in laboratory testing of battlefield tourniquets on human volunteers as the least painful, easiest to use and most effective tourniquet suited for field deployment. The C-A-T® was the only tourniquet in the study that no subject reported having difficulty applying.

Balancing the appropriate amount of force to occlude severe hemorrhaging while minimizing damage to underlying tissues allows the C-A-T® to succeed where other field tourniquets were found to exert unsafe amounts of pressure to occlude the blood flow, which may contribute to morbidities.³

A unique feature of the C-A-T® involves placing the tightening strap within a sleeve, a "strap within a strap".¹ This appeared to have the effect of more evenly distributing the circumferential force around the limb.¹ The balance of superior mechanical action (Inner Band) with thoughtful consideration for the simplicity of operator application in under than less ideal conditions (War/Battlefield) resulted in a superior device.

Based on these findings, the USAISR recommended the C-A-T® as the primary battlefield tourniquet. The Committee on Tactical Combat Casualty Care (CoTCCC) reviewed the study and recommended the C-A-T® as the tourniquet of choice and USSOCOM began issuing the C-A-T® as part of the Tactical Combat Casualty Care Transition Initiative.

In 2005, the USAISR study was published and scientifically proved that the C-A-T® is 100% effective at occluding blood flow in both upper and lower extremities and was the most safe (required less pressure) and comfortable field tourniquet. Based on these findings, the Army Surgeon General selected the C-A-T® to be issued to every deployed U.S. soldier.

In 2008, the Journal of Trauma published a study of battlefield data that validated the USAISR conclusions and identified the C-A-T® as the best prehospital tourniquet and more effective in real world situations by a 13 point difference (20% better) compared to other tourniquets utilized on the battlefield.

In 2011, Military Medicine published a study that offered further data verifying that the C-A-T® is the safest and most effective field tourniquet and that it requires 30% less pressure to achieve successful occlusion of the blood flow, which means that the C-A-T® is not only more effective, but also less likely to cause permanent nerve damage, fasciotomies, an amputation or blood clots.³ This conclusion validates the original USAISR study results.

RECOMMENDATIONS:

The C-A-T® is the only tourniquet that has been consistently validated and proven to be the safest, most effective and easiest to use solution for 100% occlusion of blood flow to both upper and lower extremities and that is suited for field deployment. A recent study published by COL Russ S. Kotwal, MD (Deputy Command Surgeon, USASOC) et al., identifies that the U.S. Army 75th Ranger Regiment has seen a successful elimination of preventable death on the battlefield while employing the principles of TCCC, proper equipment, effective training and command endorsement. As the C-A-T® is the issued tourniquet, it is clearly playing a role in reducing preventable battlefield death and should continue to be the tourniquet of choice.

1. USAISR, Laboratory Evaluation of Battlefield Tourniquets in Human Volunteers (September 2005)

2. Journal of Trauma, Practical Use of Emergency Tourniquets to Stop Bleeding in Major Limb Trauma (February 2008)

3. Military Medicine, The Military Emergency Tourniquet Program's Lessons Learned with Devices and Designs (October 2011)

4. Kotwal et al., "Eliminating Preventable Death on the Battlefield," Archives of Surgery, published online August 15, 2011



(Fig. 1) The C-A-T® (Combat Application Tourniquet®) has been validated as the best and most effective field tourniquet in multiple studies.

**Recommended by
USAISR and CoTCCC...**

**Issued by the Army
Surgeon General...**

**Validated in the
Journal of Trauma and
Military Medicine...**



(Fig. 2) The C-A-T® (Combat Application Tourniquet®) has been recommended as the primary battlefield tourniquet by USAISR and CoTCCC.



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